

# Memorandum

To: **Dave Coolidge**

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From: Jack Hunter *J.H.*

Date: 1/24/2002

Subject: Update to the SRA RF Enclosure Thermal Analysis

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Ref. 1) "SRA RF Enclosure & Hybrid Temperatures For NOAA-K & L", J. Hunter, 12/12/01

The thermal analysis, which was documented in Reference 1, has been updated and the results are documented herein. The purpose of this analysis was to compute NOAA-L SRA temperatures, which possibly could be used to compute thermal fatigue stresses on the 243.0 Mhz hybrid, RF connectors and cable. Ref. TOAR 402. The original analysis had some errors in it; mainly the hybrids were attached to the wrong walls of the enclosure. Also, RF connectors and two open holes in the enclosure were added to the math model used to compute these latest temperatures.

The math model of the SRA RF Enclosure, which shows the nodal arrangement, is illustrated in Figures 1 & 2. Predicted, cold/hot, orbital temperatures of the enclosure walls, the hybrids, and external cable are given in Figures 3 thru 10.

In the hot case, the enclosure wall temperatures vary between -17 to 48°C; whereas in the cold case the wall vary between -25 to 35°C. The 243.0 Mhz hybrid was not only conductively coupled to the enclosure wall through the four standoffs but also through the two RF connectors. The 121.5 Mhz hybrid was however conductively coupled to the wall only through the standoffs. This is why the temperature gradient between the 243.0 Mhz hybrid and its mounting surface is substantially less than the gradient between the 121.5 Mhz hybrid and its mounting surface. Ref. Fig. 4 and 8. The 243.0 Mhz hybrid temperature was not influenced by the presents of open holes in the enclosure. The **external cable temperature varied between -65 and 50°C in the hot case and between -75 and 35 in the cold case.**

why not thru  
connectors?

*Need Electronic*

FIG. 1 Nodal Arrangement Of RF Enclosure

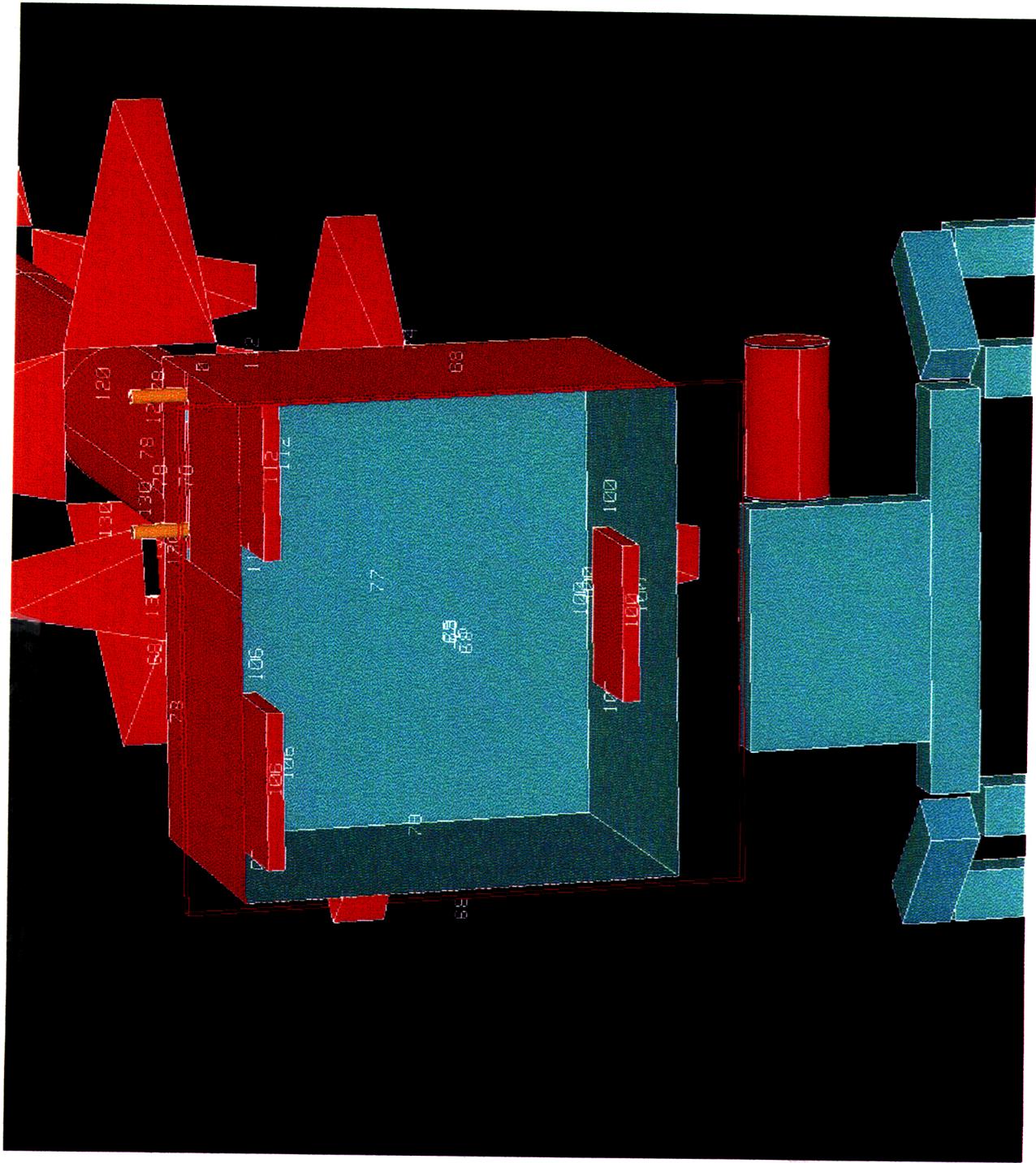
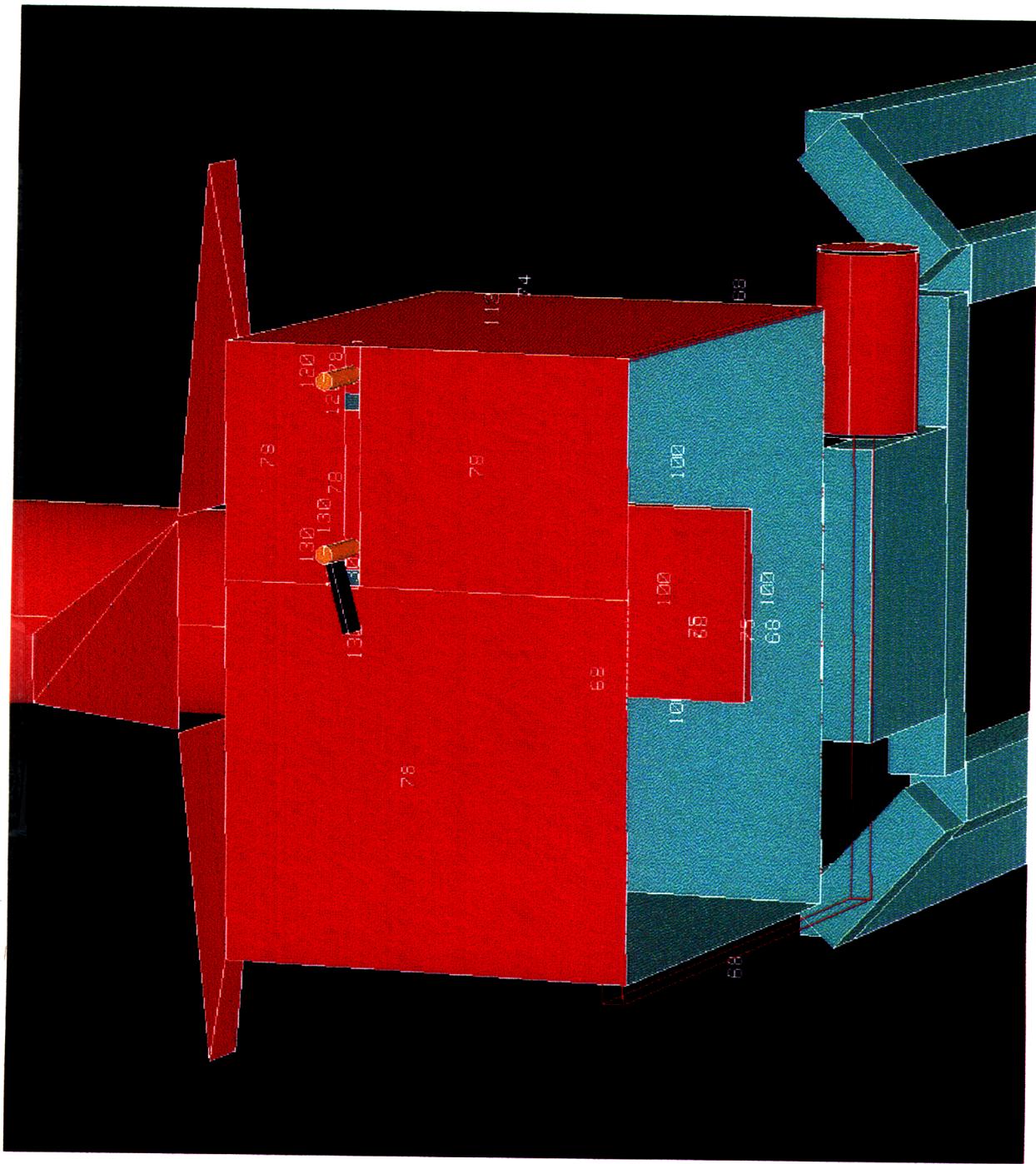
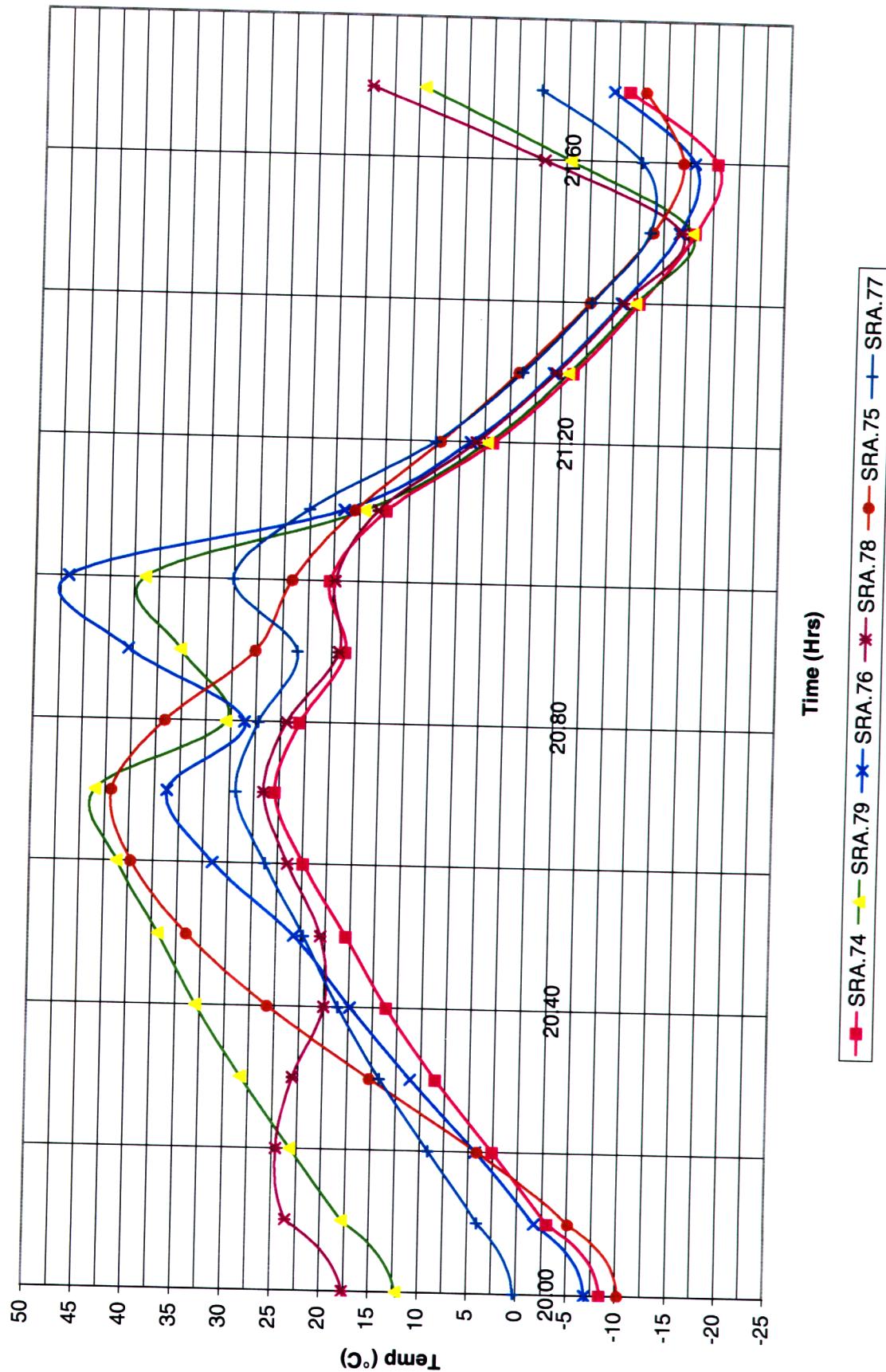


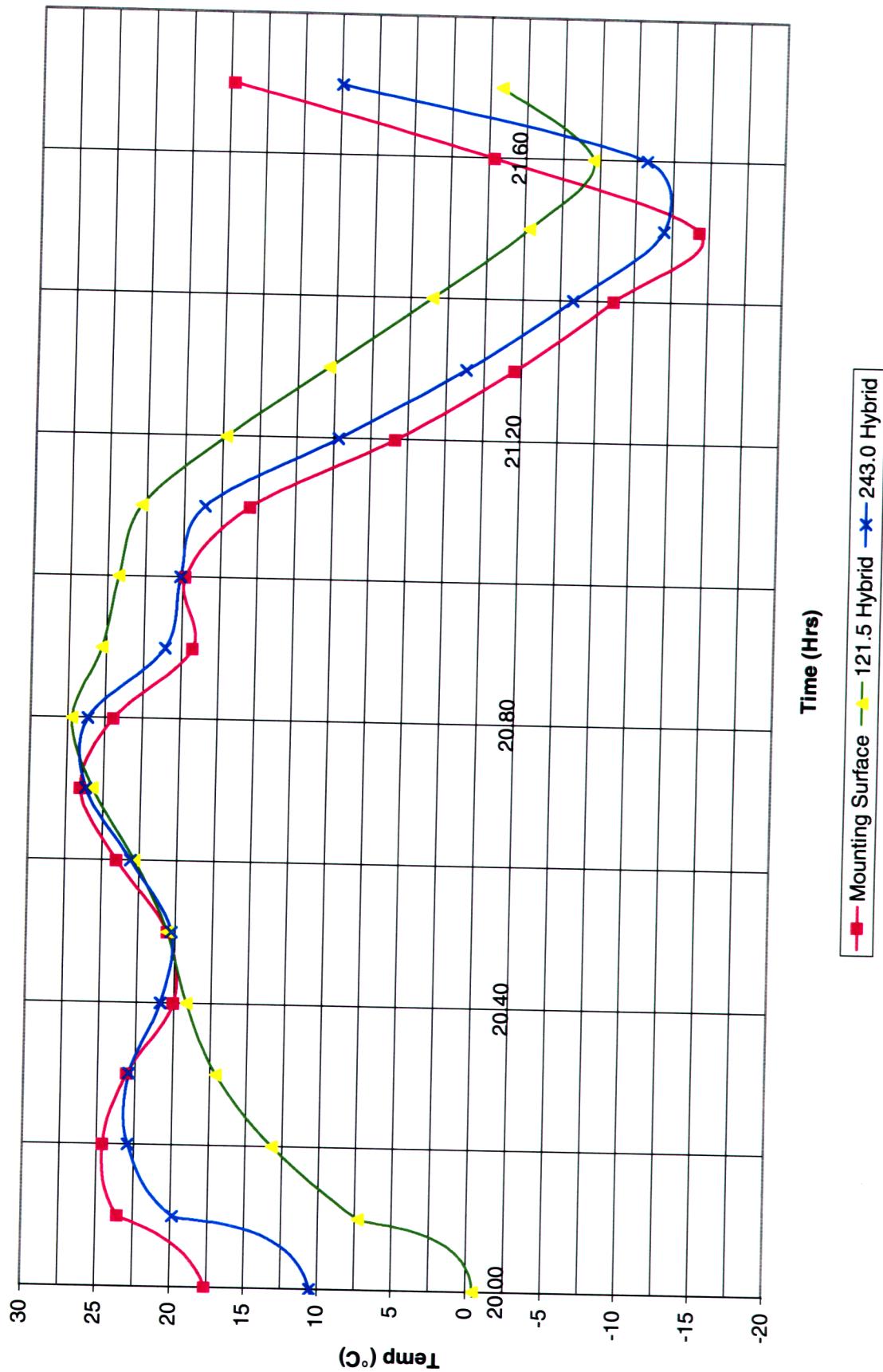
FIG. 2 Nodal Arrangement Of RF Enclosure



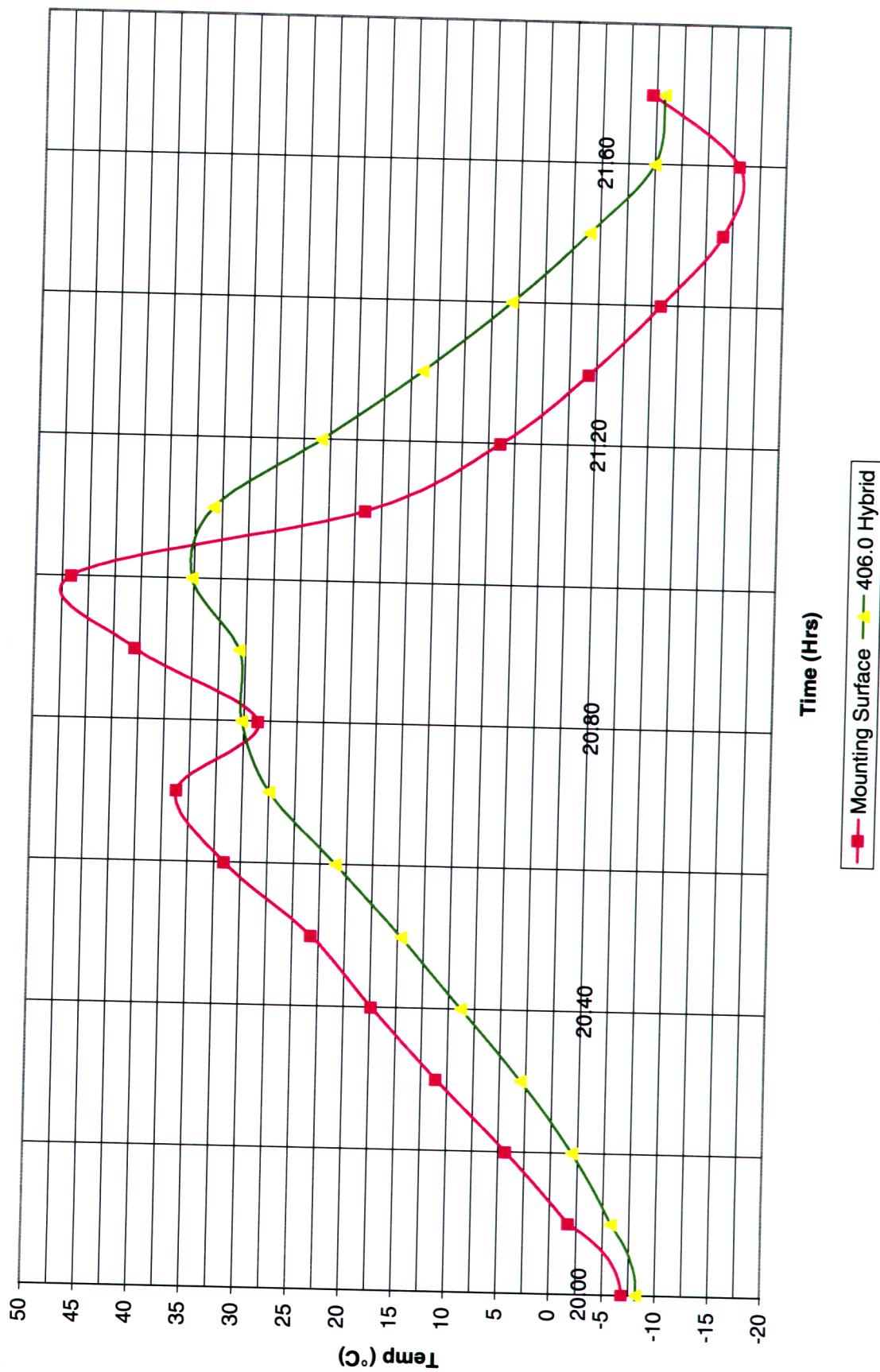
**FIG. 3 NOAA-L, SRA Temps., Hot Case, Six Sides Of The RF Enclosure**



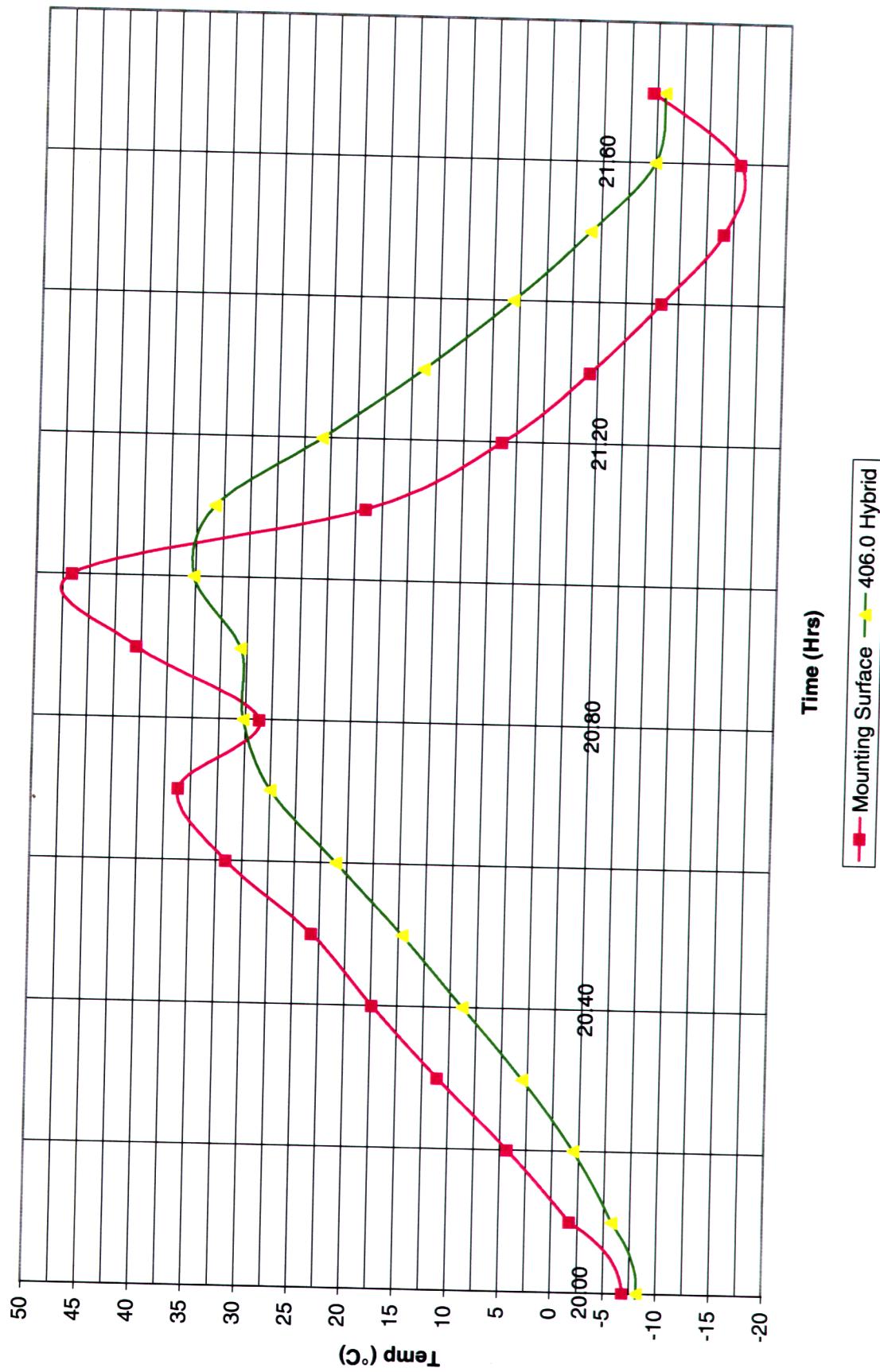
**FIG. 4 NOAA-L, SRA Temps., Hot Case, 121.5 & 243.0 Hybrids and Their Mounting Surface**



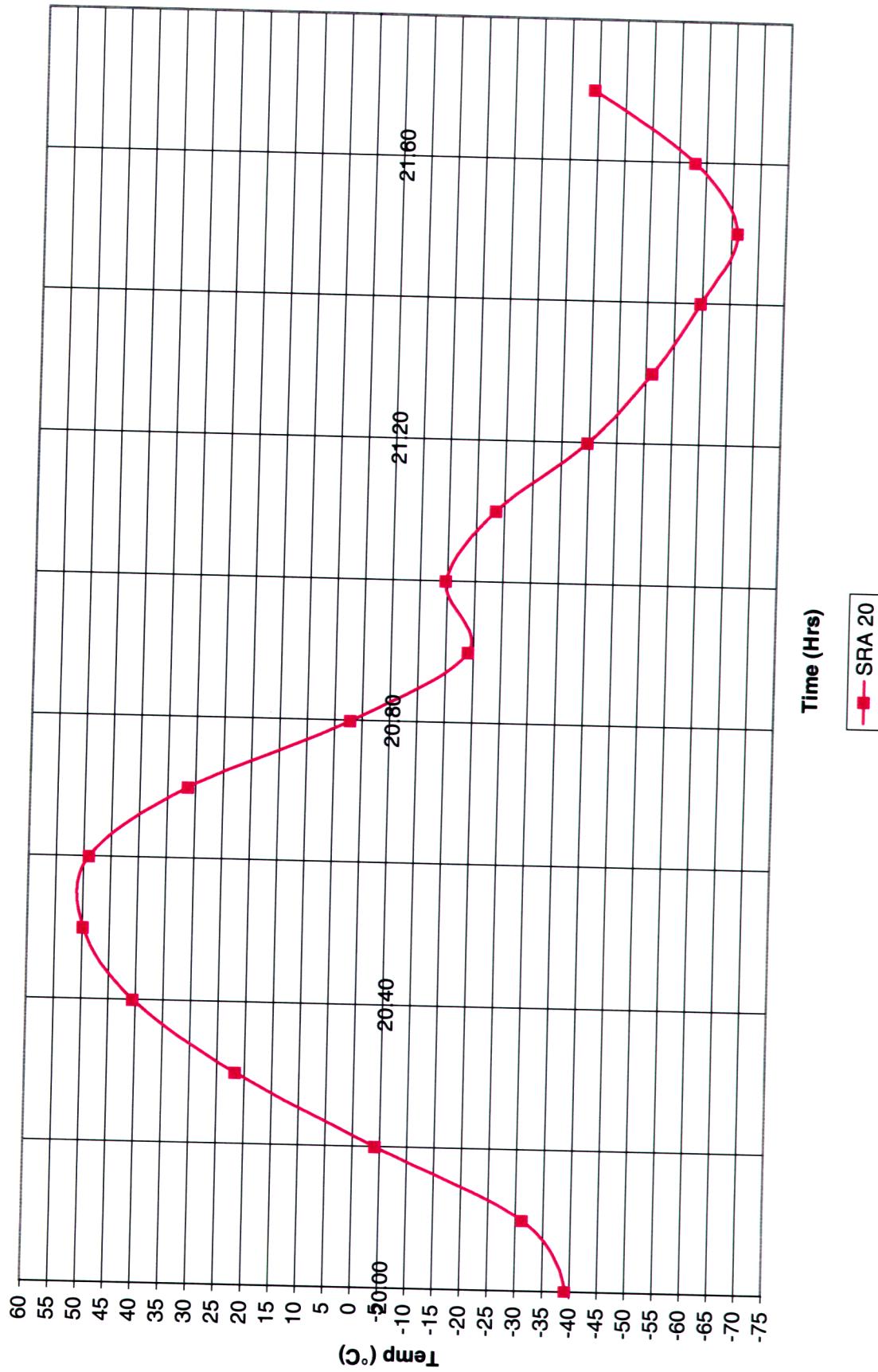
**FIG. 5 NOAA-L, SRA Temps., Hot Case, 406.0 Hybrid and Its Mounting Surface**



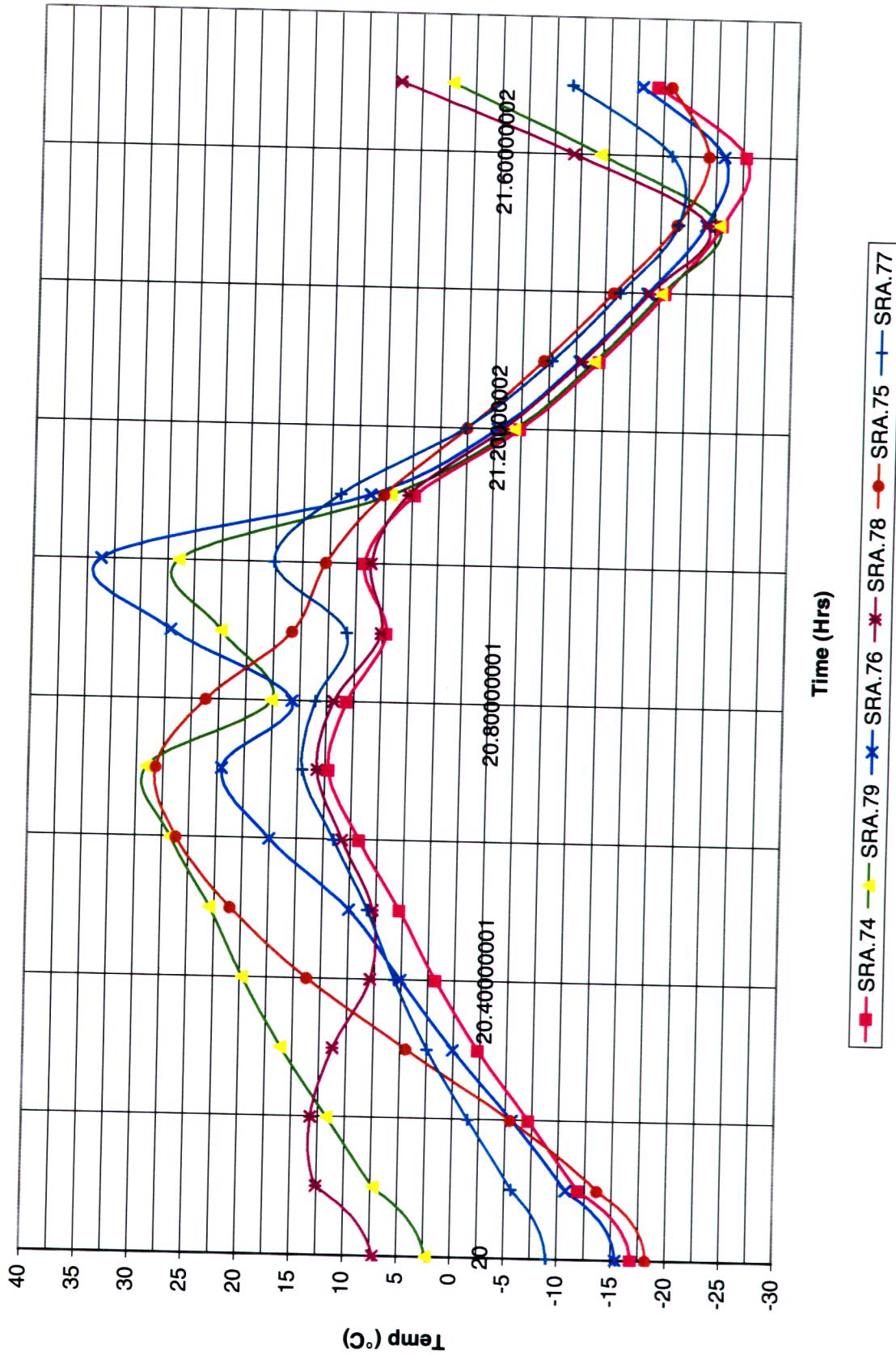
**FIG. 5 NOAA-L, SRA Temps., Hot Case, 406.0 Hybrid and Its Mounting Surface**



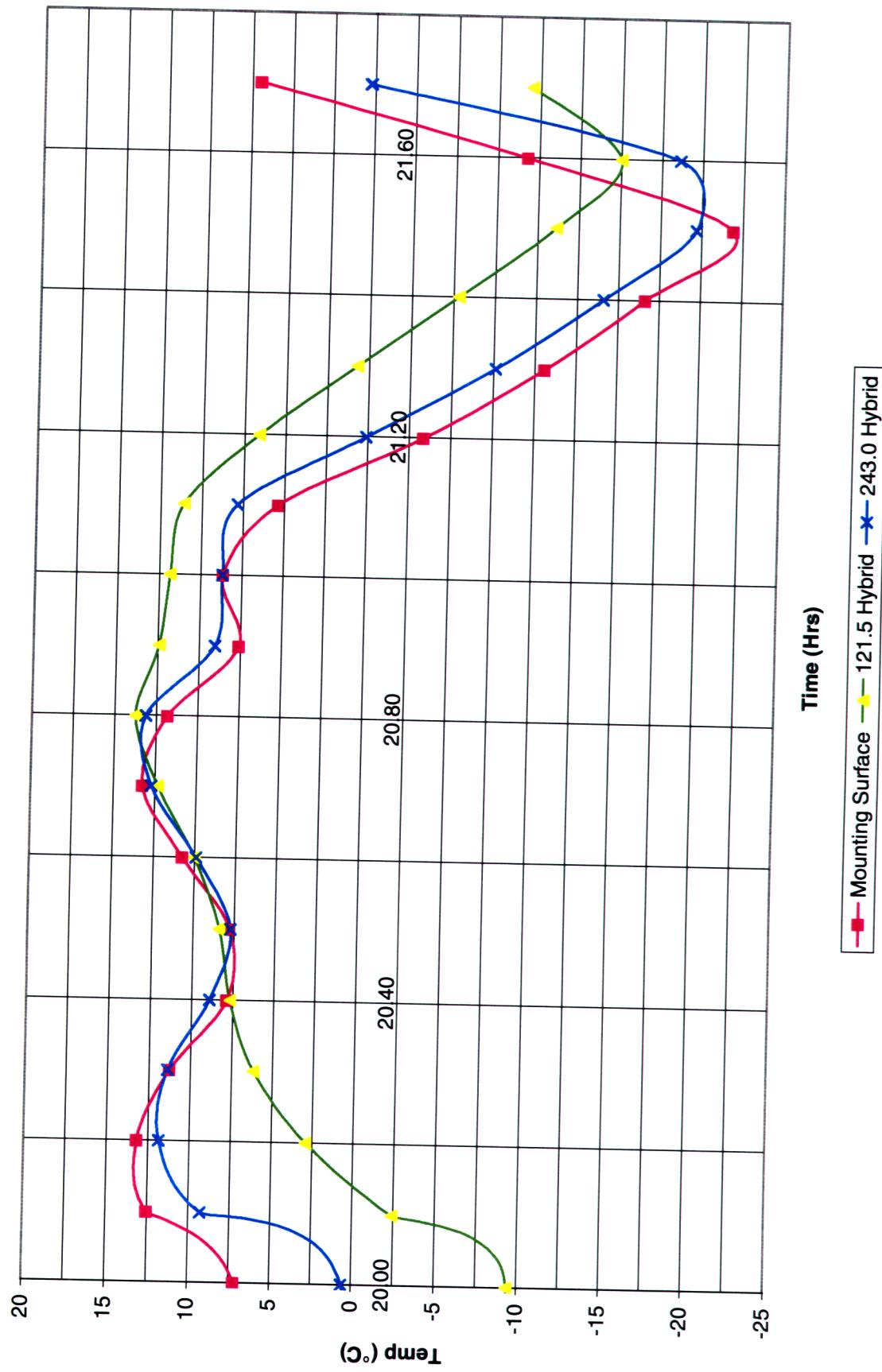
**FIG. 6 NOAA-L, SRA Temps., Hot Case, External Cable**



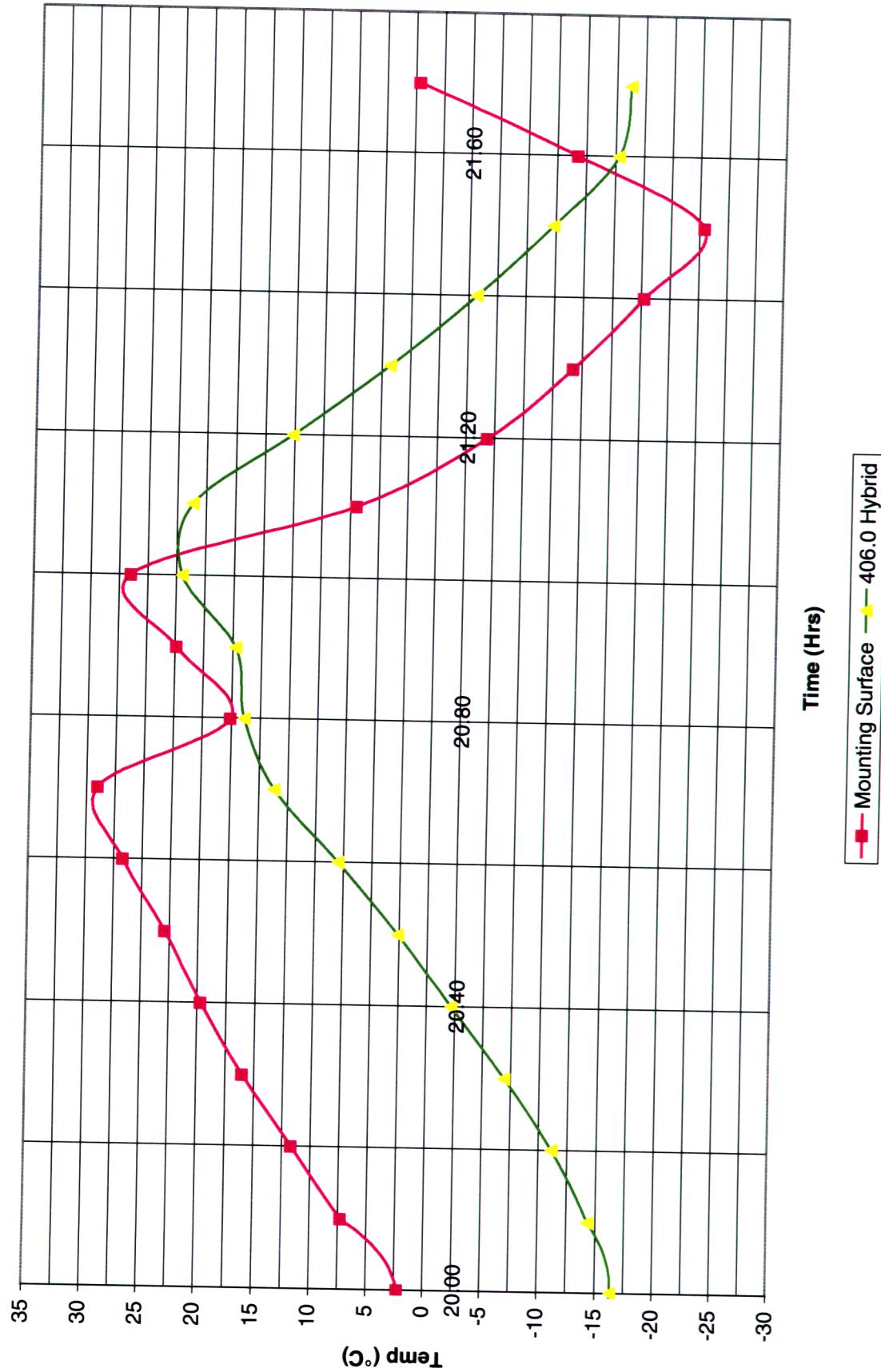
**FIG. 7 NOAA-L, SRA Temps., Cold Case, Six Sides of the RF Enclosure**



**FIG. 8 NOAA-L, SRA Temps., Cold Case, 121.5 & 243.0 Hybrids and Their Mounting Surface**



**FIG. 9 NOAA-L, SRA Temps., Cold Case, 406.0 Hybrid and Its Mounting Surface**



**FIG. 10 NOAA-L, SRA Temps., Cold Case, External Cable**

